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(54) Lead Valve

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(71) Patent Assignee: Kei-Hin Purification Devices Manufacturing Company

[Note: Names, addresses, company names and brand names are translated in the most common manner. Japanese language does not have singular or plural words unless otherwise specified by a numeral prefix or a general form of plurality suffix.]

(54) Lead Valve

Detailed Description of the Invention

1. Name of the Invention

Lead Valve

2. Scope of the Claims of the Utility Patent

(1) Lead valve characterized by the fact that it is a lead valve that is equipped with the lead part 2, which is formed from an elastic plate shaped part and which controls the opening and closing of the fluid material flow path in response to the valve seat 1 that has been placed inside the fluid material flow path, and with the fixing acceptance part 3, where the lead part is molded (formed) as it is folded and bend, and at the time of the fixing of the acceptance part the fold/bent deformation restoration force of the lead part is used as the valve opening force.

(2) Lead valve according to the above described Claim paragraph 1 of the practically novel claims of the present invention where the above described lead valve is made to have an asymmetrical shape relative to the X – X longitudinal direction rotational axis.

2. Detailed Explanation of the Invention (Design)

The present invention is an invention about a lead valve that is formed from an elastic plate shaped part (material), where especially the valve seat leakage is small and it can be manufactured at an inexpensive cost.

If we are to provide an explanation of the lead valves according to the previous technology, for example, as it has been disclosed according to the report in the Japanese Utility Patent Application Showa 52-12321, the lead valve is well known where, the lead valve is formed from the lead valve that is inserted and supported in the gap between the fixing valve seat of the body that has a valve opening and the stopper, and from the rubber type elastic material manufactured valve receiving seat, and where the above described fixing seat surface is directed towards the edge of the lead valve and it is made to have a tapered shape that is converging relative to the top surface and/or the above described valve receiving seat is directed towards the fixing seat surface and it is made to have a shape that is converging relative to the top surface, and by that the tightness properties of the gap between the lead valve and the valve receiving seat have been improved. In this case, it is necessary that either the valve seat part or the lead valve

fixing part be made to have a tapered shape and because of that the processing or molding (formation) are difficult and complex and due to that the cost becomes high and that has been a drawback.

Regarding to the present invention, it has been designed and construed regarding this point of view and because of that its goal is to suggest a lead valve where the valve seat part would have excellent tightness functionality and its manufacturing would be simple and inexpensive, and also, where the lead valve would be able to be cross exchanged with the lead valves according to the previous technology.

If we are to explain the Practical Example 1 according to the present invention based on the diagrams in Figure 1 ~ Figure 3, the lead valve 5 that is equipped with the lead part 2, which is formed from a plate shaped part that has elastic properties, such as a thin metal plate, a synthetic resin, a hard type rubber, etc., and with the fixing acceptance part 3, where the bolt opening 4 has been pierced, is folded/bent molded (formed) in advance in the direction that is at a right angle relative to the longitudinal direction. Thus, in the case when the total length dimension of the lead valve in the longitudinal direction is 20 mm, it has been confirmed empirically that if the folded state dimension is approximately 0.4 ~ 0.5 mm, an appropriate valve closing force is imparted. Also, regarding the shape of the lead valve, the lead valve is formed so that its shape becomes asymmetrical relative to the X – X longitudinal direction rotational axis, and according to the practical example, the on one side of the fixing part 3, the R part can be placed. Regarding this, it is in order that at the time of the mounting of the lead valve an erroneous assembly be prevented, namely it is so that the front and the back surface installation surface be clearly confirmed, and by that even if on the surface methods are used such as printing, coloring without changing the shape, it is a good option. Especially, also, if shape of the support seat (base plate 9) where the lead valve is installed is made to have the same shape as the outer shape of the lead valve, and it is made to have an indented groove shape, it is possible to have an assembly of the lead valve assembly surfaces (the front and the back surfaces) without mistakes. Regarding the corresponding placement of the above described lead valve 5 on the valve seat 1 that is surrounded by the fluid material flow path 7, it is mounted on the base plate 9 as the bolt 8 penetrates relative to the bolt opening 4 so that the folded/bent deformation restoration force in the state when it has been folded and bent in advance becomes the valve closing force. Regarding the mounting location of the above described lead valve, it is possible to be used in the usual counter (stoppering) valve required locations and it can be used in the internal fuel engine mechanical discharge driven pulse pressure action diaphragm fuel material pumps, etc., different types of applications.

If we are to explain the action (operation), it is according to the following: when the lead valve 5 is assembled in the base plate 9, the support seat 10 and the valve seat 1 form a flat surface and because of that they can be assembled flatly and the elastic restoration force of only the dimension δ of the folded/bent in advance state acts relative to the valve seat 1 as the valve closing force. Consequently, without using other spring force the sheet plane surface is increased and the valve seat leakage is eliminated. Also, regarding the

assembly, the erroneous assembly of the front and back surfaces of the lead valve can be prevented.

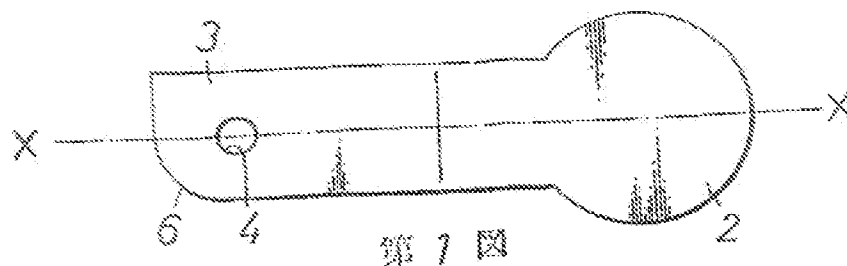
As it has been described according to the above, in the case of the present invention, it is an invention that suggests an inexpensive lead valve that is a lead valve characterized by the fact that it is a lead valve that is equipped with the lead part 2, which is formed from an elastic plate shaped part and which controls the opening and closing of the fluid material flow path in response to the valve seat 1 that has been placed inside the fluid material flow path, and with the fixing acceptance part 3, where the lead part is molded (formed) as it is folded and bend, and at the time of the fixing of the acceptance part the fold/bent deformation restoration force of the lead part is used as the valve opening force, and because of that the tightness functionality of the valve seat part are excellent and the structure can be formed easily and inexpensively, and also, this lead valve can be cross exchanged with the lead valves according to the previous technology.

3. Brief Explanation of the Figures

Figure 1 represents a front view diagram showing the first practical example of the lead valve according to the present invention; Figure 2 represents a side view corresponding to Figure 1; Figure 3 represents a cross sectional view diagram showing an assembled example of the lead valve according to Figure 1 in the valve seat.

- 1.....valve seat
- 2.....lead part
- 3.....fixing part

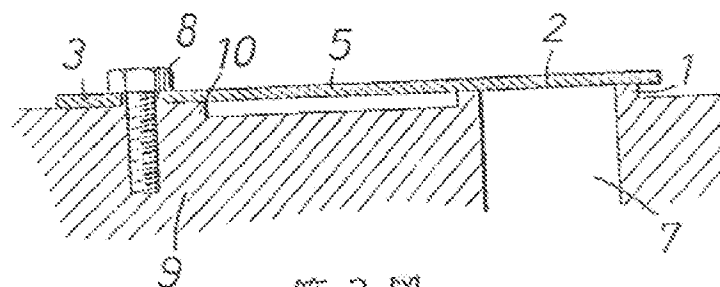
Patent Assignee: Kei-Hin Purification Devices Manufacturing Company



第1図



第2図



第3図

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824

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⑯ 日本国特許庁(JP)

⑰ 実用新案出願公開

⑱ 公開実用新案公報(U) 昭60-75771

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審査請求 未請求 (全 頁)

② 考案の名称 リードバルブ

⑥ 実 願 昭58-167182

⑦ 出 願 昭58(1983)10月28日

⑧ 考 案 者 筒 井 勝 彦 川崎市多摩区菅2489

⑨ 出 願 人 株式会社 京浜精機製 川崎市中原区市ノ坪386番地
作所

明 細 書

1. 考案の名称 リードバルブ

2. 実用新案登録請求の範囲

(1) 流体流路中に配置された弁座 1 に対応して流体流路を開閉制御する弾性板状部材より成るリード部 2 と固定支承部 3 とを備えたリードバルブにおいて、リード部を折り曲げ成形し、支承部固定時にリード部の折り曲げ変形復元力を弁閉力としたことを特徴とするリードバルブ。

(2) 前記リードバルブを長手方向軸心線 X-X に対して非対称形状にしてなる実用新案登録請求の範囲第 1 項記載のリードバルブ。

3. 考案の詳細な説明

本考案は、弾性板状部材より成るリードバルブに係り、特に弁座洩れが少なく安価に製作できるリードバルブに関する。

従来のリードバルブを説明すると、例えば実開昭 5 2-12321 号公報に開示されているように、弁孔を有するボデーの固定弁座とストッパとの間に挟持されているリード弁および前記ボデ

図 2

一の上面に固着されリード弁を受けるゴム状弾性材製弁受座とより成り、前記固定座面をリード弁の先端に向って上面に対し収斂するテーパ形状とすること及び／又は前記弁受座を固定座面に向って上面に対し収斂するテーパ形状とすることによりリード弁と弁受座との間の密封性を改良したリードバルブが公知である。この場合、弁座部分又はリードバルブの支承部をテーパ形状にする必要があるもので、加工あるいは成形が困難で高価となる欠点があった。

本考案は、かかる点に鑑み成されたもので、その目的とするところは、弁座部の密封性能に秀れ構造が簡単で安価であり、且、従来のリードバルブと交換可能であるリードバルブを提供することにある。

本考案の一実施例を第1図～第3図により説明すると、金属薄板、合成樹脂、硬質ゴム等の弾性を有する板状部材より成るリード部2と、ボルト孔4が穿設された支承部3とを備えたリードバルブ5は長手方向と直角方向にあらかじめ折曲さ

れて成形されている。そして、リードバルブの長手方向全長寸法が 20 mm の場合に、中折れの寸法は約 0.4 ~ 0.5 mm が適切な弁閉力を与えることが実験により確認されている。又、リードバルブの形状は長手方向軸心線 X-X に対して非対称形状となるように構成され、実施例では支承部 3 の片側に R 部 6 が配置されている。これは、リードバルブ装着時の誤組防止すなわち表、裏面の取り付け面を明確にするものである。形状ではなく表面に印字、着色を行なう等の方法を用いても良いものである。更に、又、リードバルブを装着する台座（基板 9）面の形状をリードバルブ外形形状と同一形状にして凹溝形状にすると、リードバルブの取付面（表裏面）を誤まりなく装着できるものである。当該リードバルブ 5 を流体流路 7 を囲繞する弁座 1 に対応配置するに当っては、あらかじめ中折れに曲げた折り曲げ変形復元力を弁閉力となるようにボルト孔 4 に対してボルト 8 を貫通して基板 9 に装着される。該リードバルブの装着箇所は、一般の逆止弁を要求される箇所および

図 4

内燃機関の機関負圧駆動の脈圧作動ダイヤフラム燃料ポンプ等、種々の応用、利用が可能である。

作用を説明すると、リードバルブ5は基板9に装着されるに当って、台座10と弁座1が一平面に形成されているので平面的に平らに装着され、あらかじめ折曲された寸法だけの弾性回復力は弁座1に対して弁閉力として作用する。従って、他のばね力を利用することなくシート面圧を向上させ、弁座洩れが解消される。又、装着に当っては、リードバルブの表裏面の取付誤組は防止される。

以上、詳述したように本考案は、流体流路中に配置された弁座1に対応して流体流路を開閉制御する弾性板状部材より成るリード部2と固定支承部3とを備えたリードバルブにおいて、リード部を折り曲げ成形し、支承部固定時にリード部の折り曲げ変形復元力を弁閉力としたので、弁座部の密封性能に秀れ、構造が簡単で成形が容易であり且、従来のリードバルブと交換が可能である安価なリードバルブを提供できたものである。

4. 図面の簡単な説明

第 1 図は、本考案のリードバルブの一実施例を示す平面図、第 2 図は第 1 図の側面図、第 3 図は第 1 図のリードバルブを弁座に装着した例を示す縦断面図である。

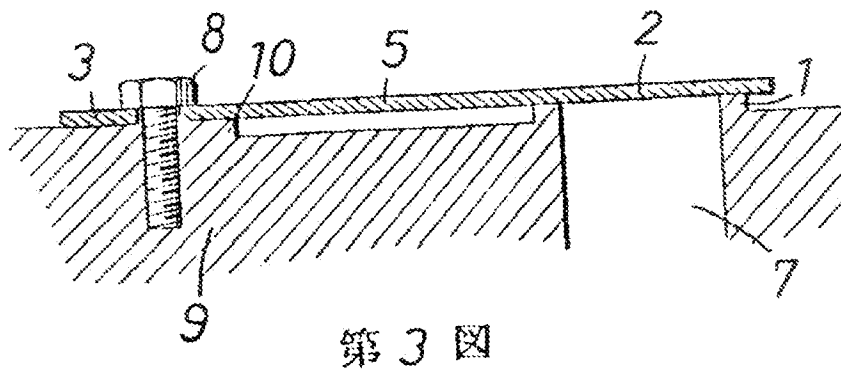
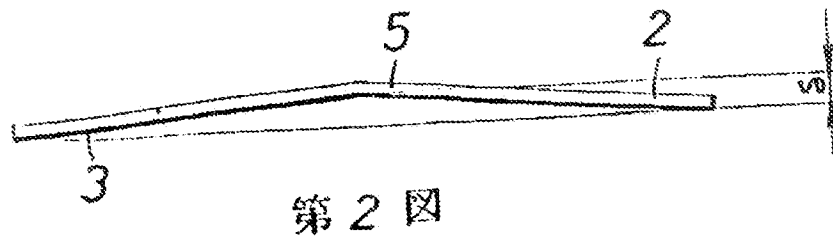
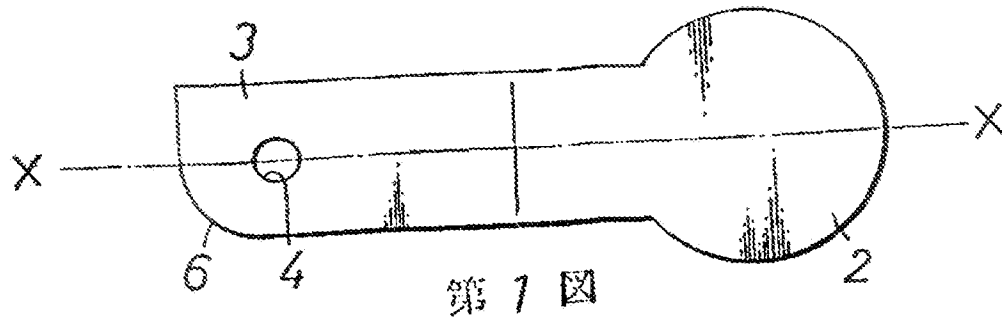
1 …… 弁 座

2 …… リード部

3 …… 支承部

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824

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